

Chapter 7 System of Equations**Section 7.2: Solving a System of Linear Equations Graphically**

Example 1: People can rent ski and snowboard equipment from two stores on Cypress Mountain.

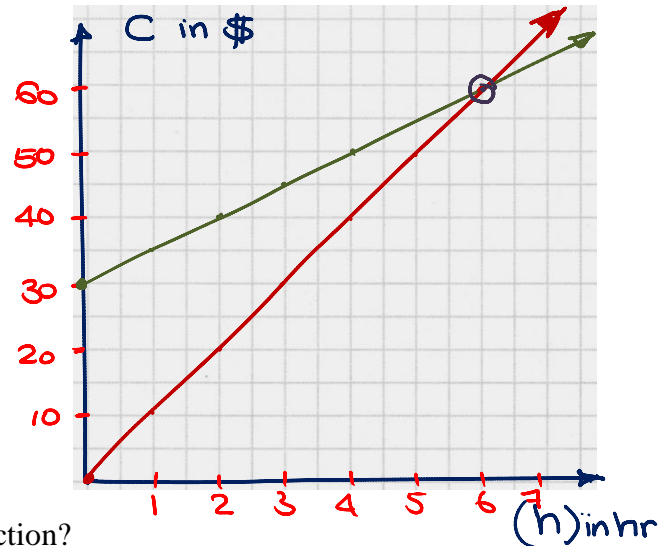
The Ski Shack charges a onetime \$30 fee and then an additional \$5 per hour. The Boogie Board charges \$10 per hour for equipment rentals.

let (C) be the total charge
let (h) be the # of hours

- a) Create a system of linear equations to model the rental charges.

store #① $C = 30 + 5h \rightarrow \text{①}$
store #② $C = 10h \rightarrow \text{②}$

- b) Graph out the two systems.



- c) What are the coordinates of the point of intersection?

Point of intersection (6, 60)

- d) What does the intersection point represent?

the point of intercept is called the solution of the linear system, where both stores will charge the same amount.

If two lines intersect, the coordinates (x, y) of the point of intersection are the solution of the linear system.

Example 2: Solve the following system graphically.

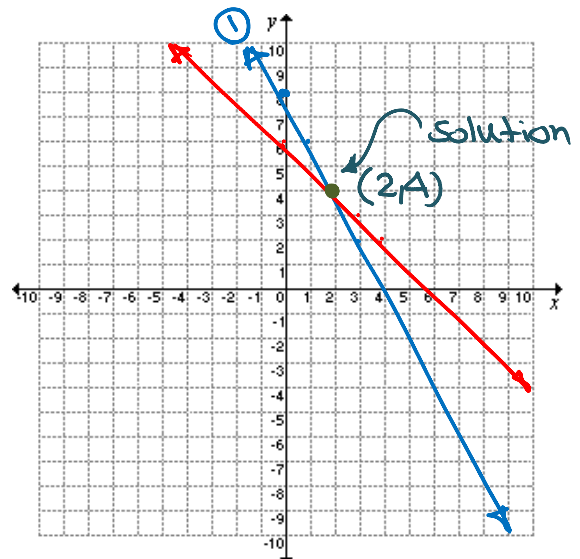
(Use the ideas from Chapter 6's slope y-int form to help you graph)

$y = -2x + 8 \rightarrow b=8 \quad m=-2$

$x + y = 6$

$y = -x + 6 \rightarrow b=6 \quad m=-1$

solution point (2, 4)



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Example 3: Solve the following system graphically.

(Use table of values)

$$x - 2y = 6 \rightarrow \textcircled{1}$$

$$3x + y = 11 \rightarrow \textcircled{2}$$

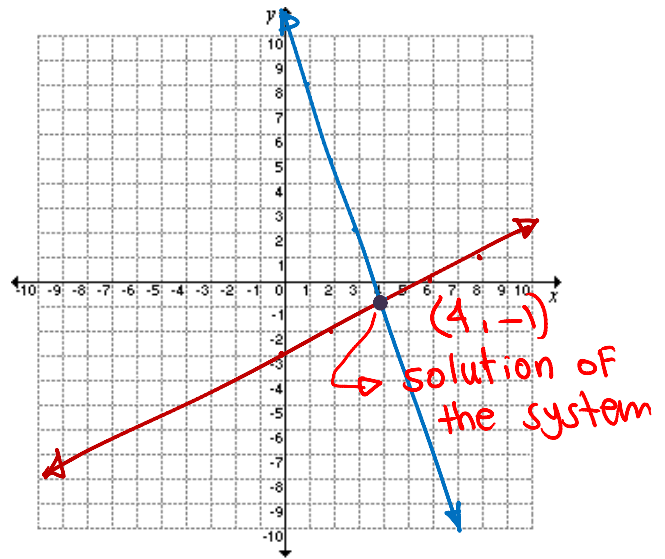
$$\begin{array}{r} x - 2y = 6 \\ -x \\ \hline -2y = -x + 6 \\ \frac{-2y}{-2} = \frac{-x}{-2} + \frac{6}{-2} \end{array}$$

$$y = \frac{1}{2}x - 3 \rightarrow \textcircled{1}$$

$$m = \frac{1}{2} \quad b = -3$$

$$\begin{array}{r} 3x + y = 11 \\ -3x \\ \hline y = -3x + 11 \end{array}$$

$$m = -3 \quad b = 11$$

**Example 4:** A parachutist descends from a height of 500 metres to 300 metres above ground in 50 seconds. During the same 50 second period, a balloonist rises from 200 metres to 500 metres.

- a) Write a system of linear equations to model their heights with respect to time.

$$\boxed{1} \quad \text{Speed} = \frac{\text{Change of } h}{\text{time}} = \frac{300 - 500}{50} = \frac{-200 \text{ m}}{50} = -4 \text{ m/s}$$

$$h = 500 - 4t \rightarrow \boxed{1}$$

$$\text{Speed} = \frac{500 - 200}{50} = \frac{300 \text{ m}}{50 \text{ s}} = 6 \text{ m/s}$$

$$h = 200 + 6t \rightarrow \boxed{2}$$

- b) Graph the system of equations to determine when the two people are at the same height. What is their height at that moment in time?

Solution Point
(30, 380)

